

THE AGE OF CEMENT

By FREDERIC J. HASKIN

Cement making is an industry which has grown a thousand fold in twenty-five years, which is fifty times greater than it was ten years ago, and which in its short life has come to rank with the first mineral industries of the land. It now has the claim to the first place in the honor roll of those mighty commercial forces which are operating to make the United States the foremost of the nations. Only coal and pig iron rank ahead of cement in the value of productions from the earth, and cement and iron are now running neck and neck. Cement long ago passed the gold mines; lead and zinc together are not nearly so valuable, and silver and copper are no longer contenders in the race. The United States began to make Portland cement in 1875. Five years thereafter the annual production had reached 42,000 barrels. By 1895 the output had reached the million barrel mark, and last year the Portland cement produced in this country amounted to 46,400,000 barrels.

Portland cement is the most versatile material man has ever used in construction. It is taking the place of timber for piles, telegraph and telephone posts, railroad ties, fence posts, and even shingles. It is used for building bridges where steel was the only possible material ten years ago. It is used for dams, locks, retaining sea walls and breakwaters where stone masonry was imperative a few years since. It is used for chimneys and sidewalks instead of brick. It is used for grain bins instead of any other material. Reinforced with bars and rods of steel, the Portland cement concrete goes into a monolithic building twelve stories high. Pressed into hollow blocks it goes into small cottages which imitate houses of stone.

There are three kinds of cement that are of importance—Portland, natural and Pozzolan. Natural cement has been made in the United States for nearly a hundred years, having been employed in constructing the Erie canal in 1819. The industry flourished, showing a gradual growth from year to year, until two years ago, when it began to show an actual decrease, and it is now on the wane. Engineers do not condemn it, and they regret that the industry is dying out. Natural cement is made by burning a naturally impure limestone of a clayey nature at a comparatively low temperature, about such as is used in burning lime. The burned stone is ground to a powder and is then ready for use.

Pozzolan cement is the oldest of cements, and was made by the ancient Romans. It is prepared by mixing powdered slaked lime with volcanic ashes. In the United States the slag from iron furnaces is substituted for the volcanic ashes, there being little or no chemical difference. This cement is better for use under water than in air.

Portland cement is of comparatively recent origin. It was first used in Leeds, England, by Joseph Aspin in

1824. On account of its similarity in appearance to certain building stone known in England as "Portland stone," it was at once called Portland cement. It is made by burning a finely ground artificial mixture of lime with silica, alumina and iron oxide, in definite proportions, at a temperature approximating 3000 degrees. The mass is then ground into a very fine powder, ready to use. It will harden under water, but will not successfully resist the action of salt water. Quite recently it has been found that by reducing the amount of alumina and increasing the iron, the cement may be used in salt water, the alumina being the vulnerable portion of the compound when attacked by sea water.

The figures given in this article relate to Portland cement only. The manufacturers, who sold \$30,000,000 worth in 1903, sold \$50,000,000 worth the next year, and the increase for 1907 is expected to be in the same proportion. From 1870 to 1890 the price of Portland cement was the price of the German product, plus the freight, going from \$4 to \$2 a barrel in that time. With the growing importance of the American industry, the prices dropped sharply after 1890, reaching the lowest average, about 80 cents a barrel, in 1904. The demand in the last two or three years has been so great, however, that the price has again risen, and for the last year the average was about \$1.15.

The manufacture of cement has proved a profitable business, not only when undertaken on a large scale. According to experts, the smallest plant which could be expected to pay a remunerative return would be a four-kiln mill, which would cost \$500,000 to erect. A ten-kiln plant would cost \$1,000,000 to \$1,500,000. Half of the Portland cement of the country is made in Pennsylvania, the largest plant being at Northampton in the Lehigh valley. The Missouri and Kansas plants come next, while in California there is a wonderful growth of the industry, due in part to the enormous amount of cement being consumed in the reconstruction of San Francisco.

The chief fault to be found with concrete for construction purposes is that a mistaken idea has been spread broadcast in the minds of people that anybody can work with it, even to erecting buildings. Therefore, when no engineer is employed, the advice of a concrete expert is not asked, and common labor is put to work, a building sometimes collapses before it is finished, just as a brick or stone or steel building could collapse under similar circumstances. Where the concrete building is properly constructed it is almost perfectly safe, as was proved in the Baltimore fire and in the earthquake and fire at San Francisco, the most severe tests to which any building could be subjected.

For smaller houses and residences, the use of the concrete building blocks is spreading rapidly. As the blocks can be made in any desired shape or fashion,



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Salt Lake trains: 8:45, 10 and 11 a. m.; 1, 2, 3, 4, 5, 6, 7, 8 p. m.

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tion, the increasing use of this material is adding to the artistic merit of small cottage construction. Thomas A. Edison has a scheme which he declares will soon be in every day practice, whereby the building of a cottage will be the work of one day. He proposes to make moulds of metal which can be taken to pieces and carried about. These moulds will be set up and screwed together and the cement pumped into them. When it hardens, the moulds are to be unscrewed and taken away, and there will be the house, roof, walls, floors, stairways, porches, columns, chimneys, everything but the doors and windows. This will reduce the price of a cottage now costing \$2000 to \$500 or less, and Mr. Edison thinks it will mean a home for every workingman.

Piles made of concrete can be driven in two minutes with an ordinary pile-driver without so much as knocking off a chip as big as a fingernail. The piles are cast in moulds, the reinforcing bars of steel being buried in them. They are corrugated with deep flutings, six or eight to the circle, and the pile has a tube running through the center. Under the hammer of the pile-driver is a cushion cap which fits on the head of the pile. Through this cap a pipe runs into the hole in the center of the pile. When the hammer first falls, water is forced through the pipe at high pressure. The water forces the sand and dirt away from the bottom of the pile and it finds its way to the surface along the flutings. As the water excavates, the hammer drives the pile into the earth. The sand, dirt, and water will sometimes squirt two or three feet above the surface from the six or eight corrugations around the pile. Once driven, the pile is there forever. It will not rot like wood, and the water cannot disintegrate it.

The first house built of reinforced concrete was a residence erected at Port Chester, New York, in 1875, by W. E. Ward. It was the pioneer of a system of construction which did not come into general use for a quarter of a century, but it is a good advertisement for the system, as it shows no signs of decay. The largest building in the world, which has no supporting pillars or columns, is in the great mosque at Lucknow, India. It was built 123 years ago of lime concrete, the cement not then being known. It has stood the test of a century and a quarter and is in perfect condition. The largest dam in the world is being built in the Shoshone irrigation works of cement. The largest concrete bridge in America is that over the San Joaquin river in Fresno county, California, and the longest spans of any American concrete bridge are the five spans of 150 feet each in the new Connecticut avenue bridge in Washington City.

The Parthenon of Athens has been the accepted ideal of architectural beauty for centuries. It has never been reproduced in exact dimensions but once, and that was in the Fine Arts building of the Tennessee Centennial exposition at Nashville ten years ago. The main body of the building was of brick and stone, but the pillars were of lath and plaster, and the faithful casts of the statues of the frieze and pediment were in plaster. This Parthenon is now being made permanent, every bit being recast in cement, materials as enduring as the original stone with which the Greeks built the crowning glory of the greatest race of architects.

Tomorrow—"Precious Stones in America" will be Mr. Haskin's subject.

DeWitt's Little Early Risers. Small, sure, safe pills. Sold by Amstee-Brice Drug Co., 44 Main st.

Loses Arm Handling Money. MANILA, July 22.—Major Paymaster Eugene Coffin has had his left arm amputated the result of infection from the handling of money paying the troops. He was a veteran of the Civil war and a member of the old McKinley regiment.

Queen Honors Delegates. THE HAGUE, July 22.—The hearts of the various delegations to the peace conference left today for Amsterdam, where Queen Wilhelmina gave a dinner in their honor. Before the banquet the queen presented each delegate with a beautiful commemorative memorial of the second peace conference.

Pioneer Day at Liberty Park. Held's Band.

Ask for that new bread at your grocery, Vienna Walnut Bread.

Guessing Contest Closed!

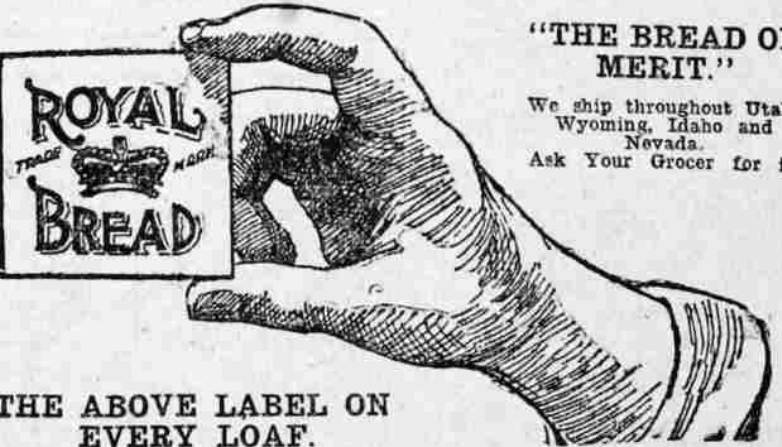
Actual Number Envelopes in Our Window 1673

Nearest Guess, 1611—By C. J. Allred

Second, 1743—By C. C. Woodward

Third, 1600—By Fisher Harris

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Time Table in Effect June 1, 1907.

Trains Leave Salt Lake.	Trains Leave Ogden and Farmington.
8:50 a.m.	7:15 a.m.
8:45 a.m.	10:05 a.m.
10:00 a.m. (Local)	12:00 p.m.
11:00 a.m.	3:00 p.m.
2:00 p.m.	5:00 p.m.
4:00 p.m.	7:45 p.m.
6:00 p.m.	9:00 p.m.
7:00 p.m.	10:30 p.m.
8:00 p.m.	

Sunday at 9:30 p. m.

Sunday and holidays, specials for Lagoon at 2 and 5 p. m.

SIMON BAMBERGER, President and Genl. Manager.

26 TRAINS DAILY.

SALT AIR TIME TABLE.

Depot, Second South, Between Third and Fourth West.

LEAVE	ARRIVE
10:00 A. M.	1:00 P. M.
2:00 P. M.	3:15 P. M.
2:45 P. M.	4:00 P. M.
3:30 P. M.	4:45 P. M.
4:15 P. M.	5:30 P. M.
5:00 P. M.	6:15 P. M.
5:45 P. M.	7:00 P. M.
6:30 P. M.	7:45 P. M.
7:15 P. M.	8:30 P. M.
8:00 P. M.	9:15 P. M.
8:45 P. M.	10:00 P. M.
9:30 P. M.	10:45 P. M.
10:15 P. M.	11:30 P. M.

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Festival Chorus in the "Minnahaha" from "Havran" Salt Lake Tab. Choir, and great programme. J. J. McEllan and H. A. Conductors.

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